tant vehicles of transmission. Commonly implicated are shellfish and fish that are eaten raw or undercooked, and cooked foods, such as rice, that are eaten after hours of storage at ambient temperatures.

There is no practical way to keep cholera from being introduced by travelers from Latin America. Travel restrictions at international borders have failed because most persons infected with cholera are asymptomatic; in the first day or two of illness, they may have no vibrios in their stools, and they may evade checkpoints. When, and not if, cholera is imported to California and other parts of the United States from south of the border—just as one or two cases are regularly imported each year to California from other endemic areas of the world—we expect that it will be promptly contained and not followed by large community outbreaks.* The United States has protected water supplies, good water and sewage treatment, and good separation of our sewage systems from our water supply systems. Potential pockets do exist, however, such as migrant labor camps, where infection can be introduced and spread within and among camps. Some local health departments have reviewed the water and sewage systems available in such camps and gained the cooperation of management and of workers in establishing surveillance for clinical cholera.

What will the clues be? Physicians should consider cholera when a person 10 years of age or older has painless, watery, afebrile diarrhea so severe that it can cause severe dehydration or death, especially when the diarrhea is of "rice water" character (sometimes it has a mild, inoffensive fishy odor) and the patient or his or her contacts have recently been in Latin America.

Any suspicion of clinical cholera should be immediately reported to local public health authorities and the stool specimen plated on thiosulfate-citrate-bile salts-sucrose (TCBS) agar, which inhibits the overgrowth of competing microflora. In addition to direct TCBS plating, alkaline peptone water enrichment will enhance recovery of the organism. Cary-Blair is a good transport medium for fecal specimens. Though isolation of *V cholerae* is the preferred way to confirm the diagnosis, laboratory diagnosis can also be made by a notable rise in vibriocidal or antitoxic antibodies between acute- and early convalescent-phase serum specimens in persons not recently immunized.

Treating cholera is simple and straightforward. Most important is prompt fluid and electrolyte replacement to correct volume depletion, acidosis, and electrolyte imbalance. While it was previously thought that intravenous therapy was necessary, we now recognize that only the most severely ill patients and those too obtunded or unable to drink need intravenous therapy. All others can be treated by oral replacement therapy. Details on the preparation and composition of various oral replacement therapies for mild to moderate diarrhea and of intravenous replacement therapy for severe cases are available from state or local health departments.

*Cholera was imported to California on February 14, 1992, when an airline flight that had originated in Buenos Aires, Argentina, and had made an intermediate stop in Lima, Peru, arrived in Los Angeles. Two days later, five passengers were admitted to Los Angeles-area hospitals with severe dehydrating diarrhea; one passenger died. Interviews with 175 of 356 passengers and crew members revealed 56 (32%) with diarrhea in the week following the flight. Of these, 40 (71%) sought medical attention and 7 (13%) were hospitalized. Worldwide, 102 passengers and crew members were eventually found to have laboratory evidence of cholera by positive stool culture or high vibriocidal antibody (minimal attack rate, 102/356 = 29%). No secondary cases were reported among contacts. The epidemiologically implicated food was a seafood salad served on the Lima to Los Angeles leg of the trip (Jason Eberhart-Phillips, MD, Los Angeles County Department of Health Services, oral communication, March 1992). That dish was not provided by the Lima caterer to other planes with US destinations.

While antibiotics are not necessary to treat cholera, tetracycline and other antimicrobial agents do limit the duration and volume of diarrhea and the duration of intestinal carriage of *V cholerae.*

A parenteral cholera vaccine is available, but it decreases the risk of clinical cholera by only 50% and protection lasts only three to six months. The vaccine does not decrease the severity of disease in those in whom cholera develops, and, because it does not prevent asymptomatic infection, it provides little protection against importing the disease. Oral vaccines are under investigation; none have been licensed in the United States.

Travelers to cholera-affected areas should be advised not to rely on the cholera vaccine; to drink only boiled or chemically purified water; avoid ice; eat only those fruits and vegetables that are freshly peeled or cooked; avoid raw or undercooked fish or shellfish; and, perhaps, only swim in chlorinated pools.

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Clove Cigarettes

CLOVE CIGARETTES, also known as "kreteks," are tobacco-containing cigarettes compounded with minced cloves. They have been produced in Indonesia for local consumption and export in Southeast Asia for many years. In the 1970s, they became popular in Australia and in the 1980s became a fad in the United States, especially in California. Adverse publicity over suspected health problems appears to have resulted in greatly reduced consumption after 1984, and they are now uncommon in the tobacco shops, convenience stores, and "head shops" where they used to be sold. No ban or restriction on sales (except to minors) prevents the reintroduction of the product by distributors on a large scale in the future, however.

Clove cigarettes have been used most heavily by younger smokers, reflecting an exotic and "new wave" image. In one survey of adolescents in northern California in 1985, 20% of boys and 26% of girls had experimented with them; their use was associated with the use of other substances as well, mostly tobacco. Clove cigarettes are sweetly aromatic, and some numbing of the mouth occurs. The effect is to remove much of the unpleasantness of cigarette smoking for new smokers. They have been called "trainer" cigarettes.

The active ingredient in clove oil is eugenol, a common topical anesthetic extensively used in dental formulations. Although eugenol appears to be safe when applied topically, inhaling the agent is a new issue.

Adverse health effects are suggested by case reports collected by the Centers for Disease Control and the California Department of Health Services; some are not well documented, but two fatalities have been reported. The best documented case to date suggests aspiration pneumonitis—the eugenol, acting as a topical anesthetic, may impair the swallowing mechanism and compromise the airway. Long-term health effects have not been studied.

Of equal concern has been the potential for conditioning smoking behavior among adolescents. Clove cigarettes are a less noxious smoking habit because of their acceptable taste and an anesthetic effect on mucous membranes that lessens discomfort. The habit had been associated with many social trends important among adolescent peer groups: new wave music, "natural" and herbal products, athletic activity (surfing), exoticism (Indonesian names and brightly colored packages), and parental unawareness (until widespread publicity focused attention on the fad). As such, clove cigarettes may represent a dangerous potential for initiating previously inexperienced smokers to the habit.

The California legislature considered a ban on clove cigarettes in 1989 but declined to take action. Other states have enacted varying measures for control, but because tobacco products are exempted from food, cosmetic, and drug regulatory legislation, there appears to be no legal basis for federal action apart from those provisions that apply to all tobacco products.

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Health and Electromagnetic Fields

TWO TYPES of epidemiologic studies have suggested that the health of humans may be affected by exposure to electromagnetic fields (EMF). Occupational studies, using proportional mortality to detect associations between adult cancer and occupational exposure to electromagnetic fields, have produced fairly consistent evidence of a slightly elevated risk of total leukemias and acute myelogenous leukemia among workers with presumed high exposure to EMF. These occupations include telephone line workers, installers, and repairers; telephone and telegraph operators and operators of other communications equipment; photographic equipment manufacturers (including movie projection equipment); and electronic and electrical engineers. These workers have an excess risk of about 20%. Case-control studies have sometimes produced similar risk estimates, sometimes not, and have also produced similar risk estimates for brain tumors, primarily astrocytoma, and a higher risk for breast cancer in men.

Studies using residential wiring measurements have generally indicated an increased risk of childhood leukemia or brain cancer. Exposure measurement has produced a perplexing anomaly, however. In early studies a surrogate measure of EMF was used, consisting of a "wire code" derived from the configuration of the wiring in and around a house and presumably categorizing residences according to the current available to the residence and the EMF field generated. An elevated risk was associated with high-current wiring codes. Later studies, attempting both to replicate and to use more direct measurements of EMF, have nearly always confirmed the association between wiring codes and leukemia or brain cancer at risk levels between twofold and threefold but have failed to find any relationship with more direct measurements of EMF. Although there is a demonstrated relationship between measured EMF and residence wiring codes and between wiring codes and childhood cancer risk, there is as yet no proven relationship between measured EMF and cancer risk.

What do wiring codes actually measure? A number of possibilities have been proposed. Some have suggested that an aspect of EMF other than total hours of exposure may be important, such as the size of the spike in amplitude of electric potential when an alternating current is turned on or the harmonic frequencies to 60 Hz that may be present. Another explanation is that in residences with very high current, the electric ground, which is usually connected to the plumbing, leaches carcinogenic heavy metals from pipes into drinking water by electrolysis.

Electromagnetic field physics and in vitro and in vivo study results have not shed light on this anomaly. Physicists point out that the magnitudes of many of the electric fields under investigation are, at the cellular level, less than those induced by neuromuscular events in the body and that the earth's magnetic field is greater than many of the magnetic fields under consideration. Some biologic effects in vitro and in vivo have been documented, however. Induction of ornithine decarboxylase, taken to indicate a promoter effect, has consistently been shown in various cell lines in response to EMFs induced by alternating current of certain (for example, 16 Hz) but not all frequencies. Raising mice for three generations in a strong electromagnetic field fails to increase the incidence of any malignant neoplasm, but reduced pineal output of melatonin in both rats and humans in response to magnetic fields has been reported. The relevance of this finding to leukemia or brain cancer is not known.

Studies of electromagnetic fields and childhood cancer have focused on exposures resulting either from proximity to high-voltage lines or from residential wiring or appliances. Results of studies of risk using proximity to power lines have generally been negative or, when positive, have suggested dose-response relationships inconsistent with a causal interpretation. The possibility that residential or appliance-related exposures may constitute a risk cannot be discounted, but it has not been confirmed.

Physicians may encounter patient anxiety over exposure to EMFs. Concerned parents may feel safer substituting non-